

Operating characteristics of the Martin resilient wheel spoke. (Report No. 40-A.) J. C. Little and R. H. Neill. American Steel & Wire Company. November 29, 1943.

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VIBRATION FATIGUE LABORATORY
AMERICAN STEEL & WIRE COMPANY

Operating Characteristics of
the Martin Resilient Wheel Spoke

Report #40-A

November 29, 1943

This report covers additional tests made on Martin Resilient Wheel Spokes; previous work has been reported in this Laboratory's Report No. 40.

Procedure:

One rubber and one neoprene spoke were subjected to the repeated-deflection test as detailed in "Procedure - Part C" of Report No. 40. Initial extension was 5/8 inch; maximum extension was 1-5/8 inches. A high-speed turbine type blower was arranged to deliver a stream of 62°F air at a velocity of approximately 50 miles per hour on the spokes during the test. This set-up is shown in Figure XVII.

Results:

In Figures XVI and XVII are plotted free spoke length vs. cycles for the two spokes used in this test. In addition, the data for the corresponding tests from Report No. 40 has been replotted to compare the effect of air cooling. The surface temperatures of the spokes are plotted in Figure XVIII for the first 200,000 cycles of continuous operation. The symbols on the curves refer to the same stations as shown in the sketch in Report No. 40.

Discussion:

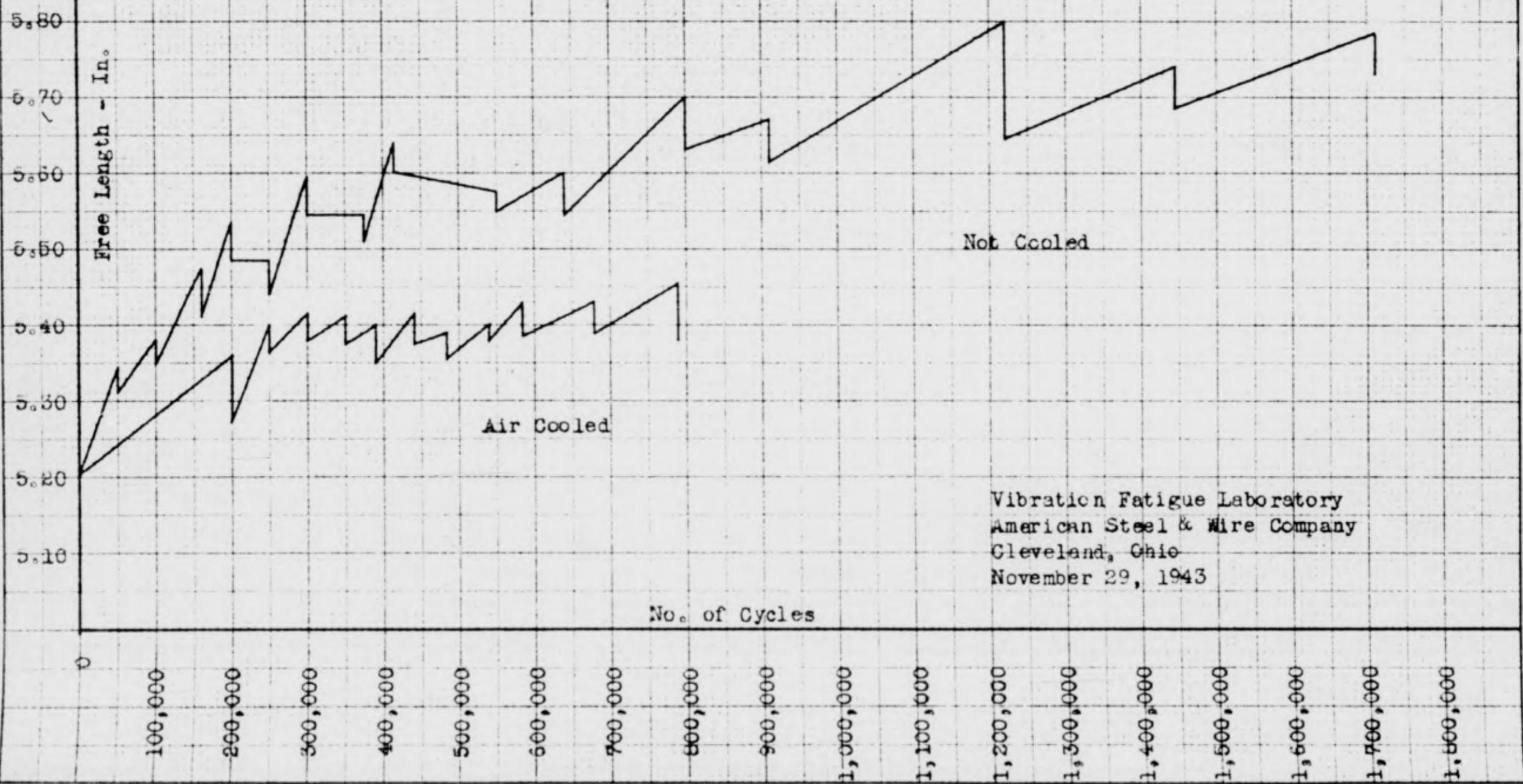
It is apparent from the foregoing tests that the reduction in spoke temperatures by air cooling has an appreciable effect on the stretch characteristics. Since these testing conditions were closely approach those of a wheel in service at 50 miles per hour, it is reasonable to assume that the amounts of permanent set obtained in the revised test are more representative of what might be encountered in the field. In the case of both the rubber and neoprene spokes the amount of permanent set was reduced about one-half by air cooling. As in the original test, the neoprene spoke sets more and generates a slightly higher temperature than the rubber spoke.

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Figure XVI

FREE LENGTH VS. CYCLES
RUBBER SPOKE #5

5/8" Initial Extension
1-5/8" Maximum Extension
600 Cycles Per Min.



Vibration Fatigue Laboratory
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Cleveland, Ohio
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Figure XVII

FREE LENGTH VS. CYCLES
NEOPRENE SPOKE #5
5/8" Initial Extension
1-5/8" Maximum Extension
500 Cycles Per Min.

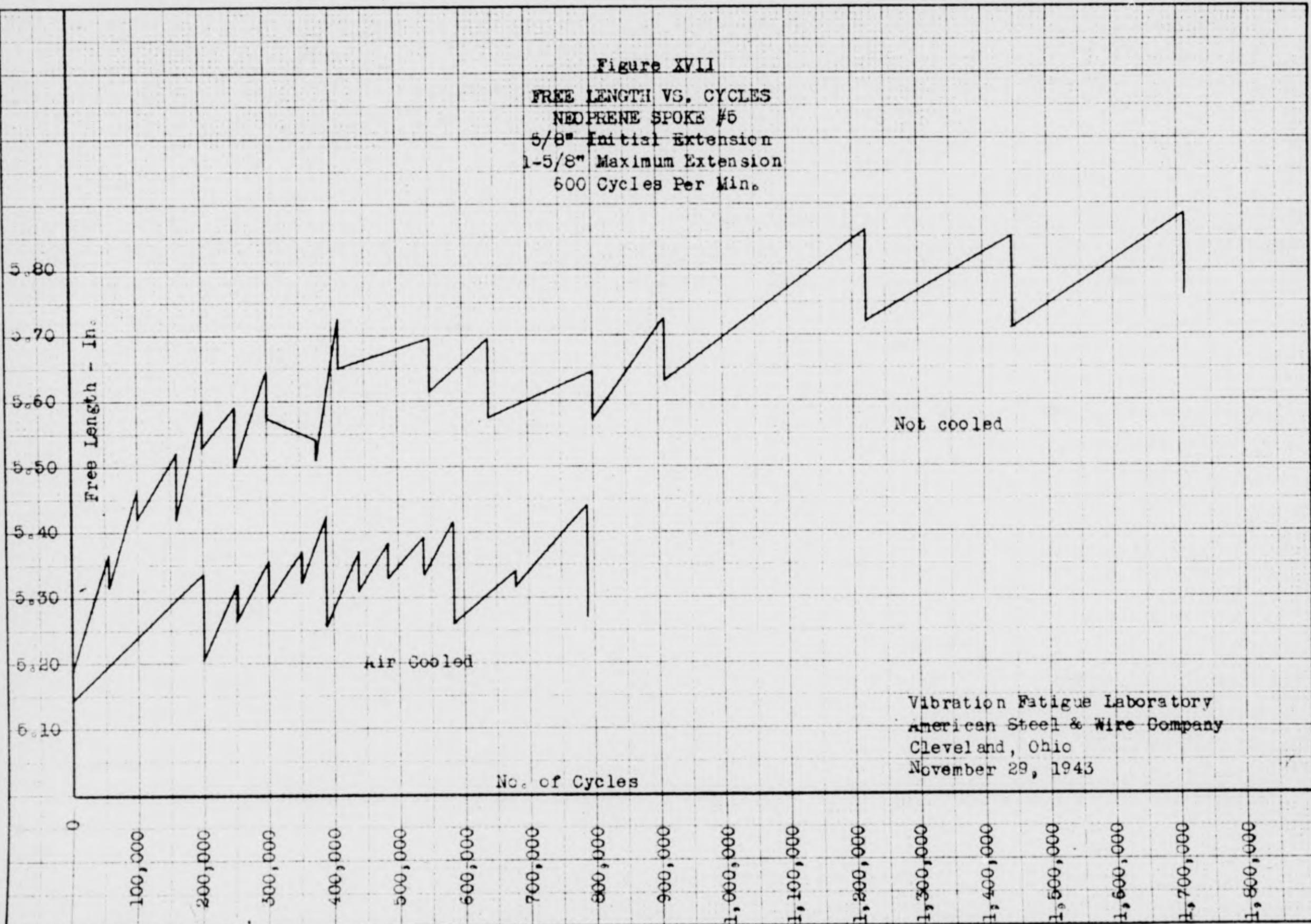
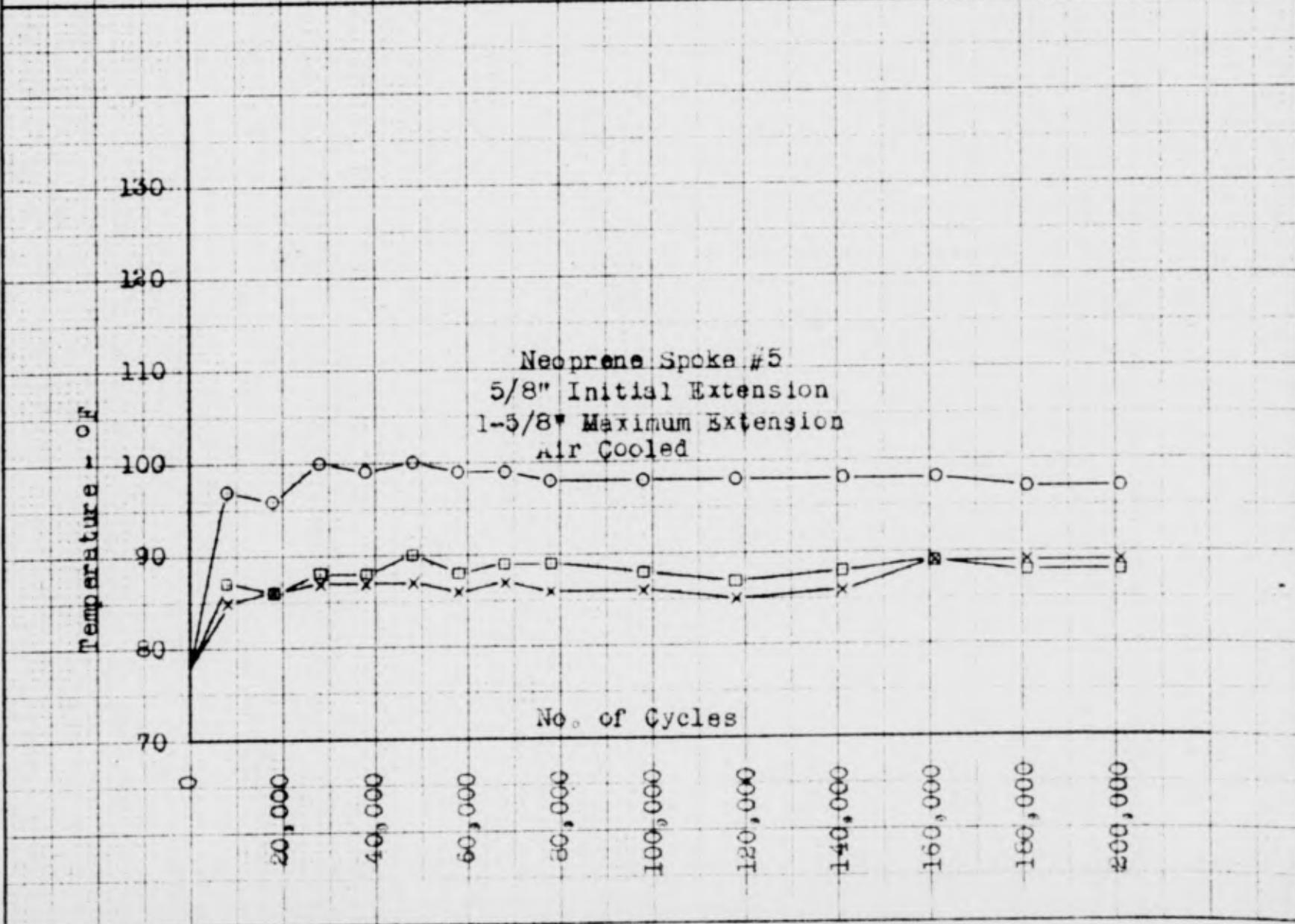
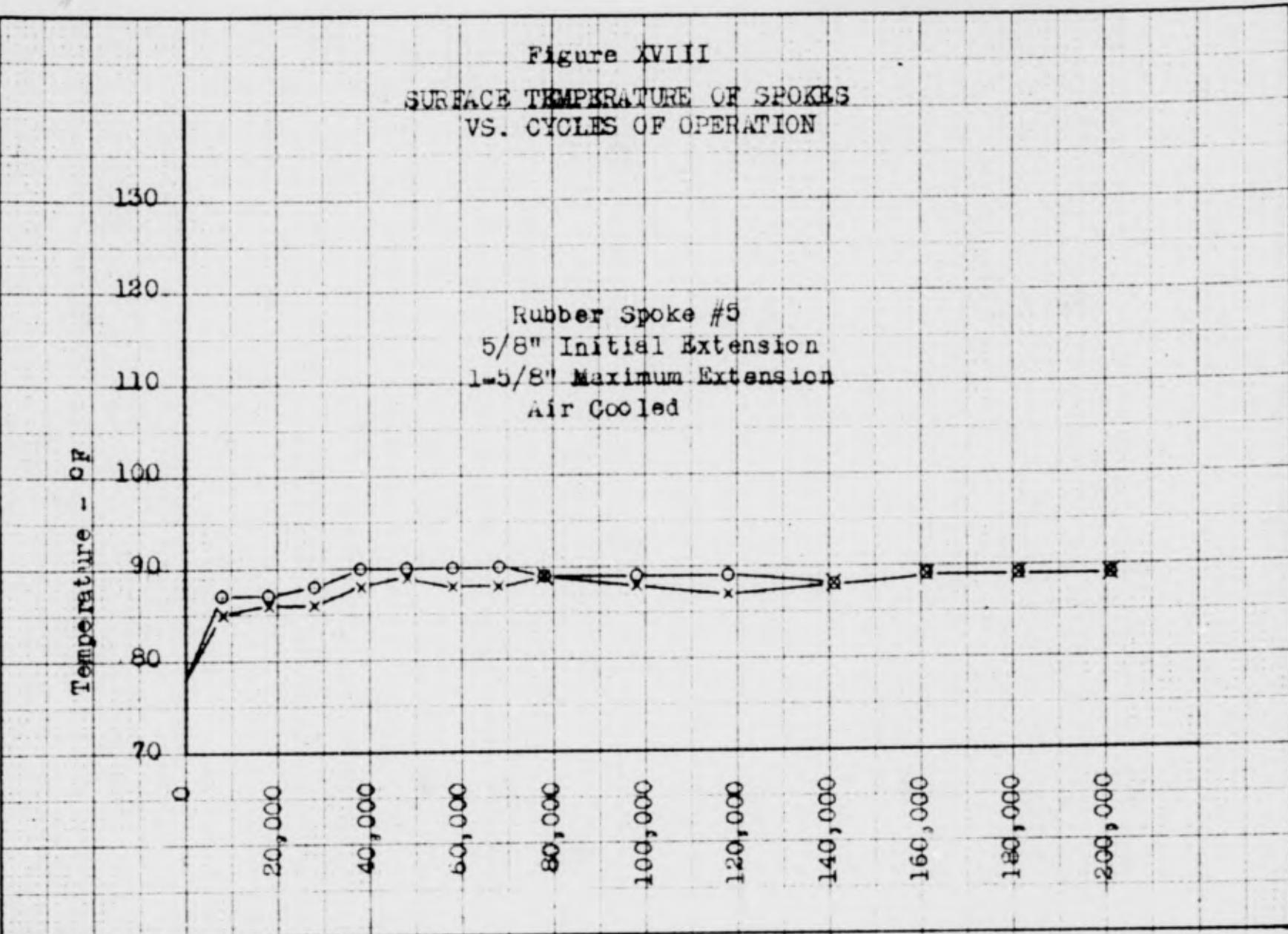


Figure XVIII
SURFACE TEMPERATURE OF SPOKES
VS. CYCLES OF OPERATION



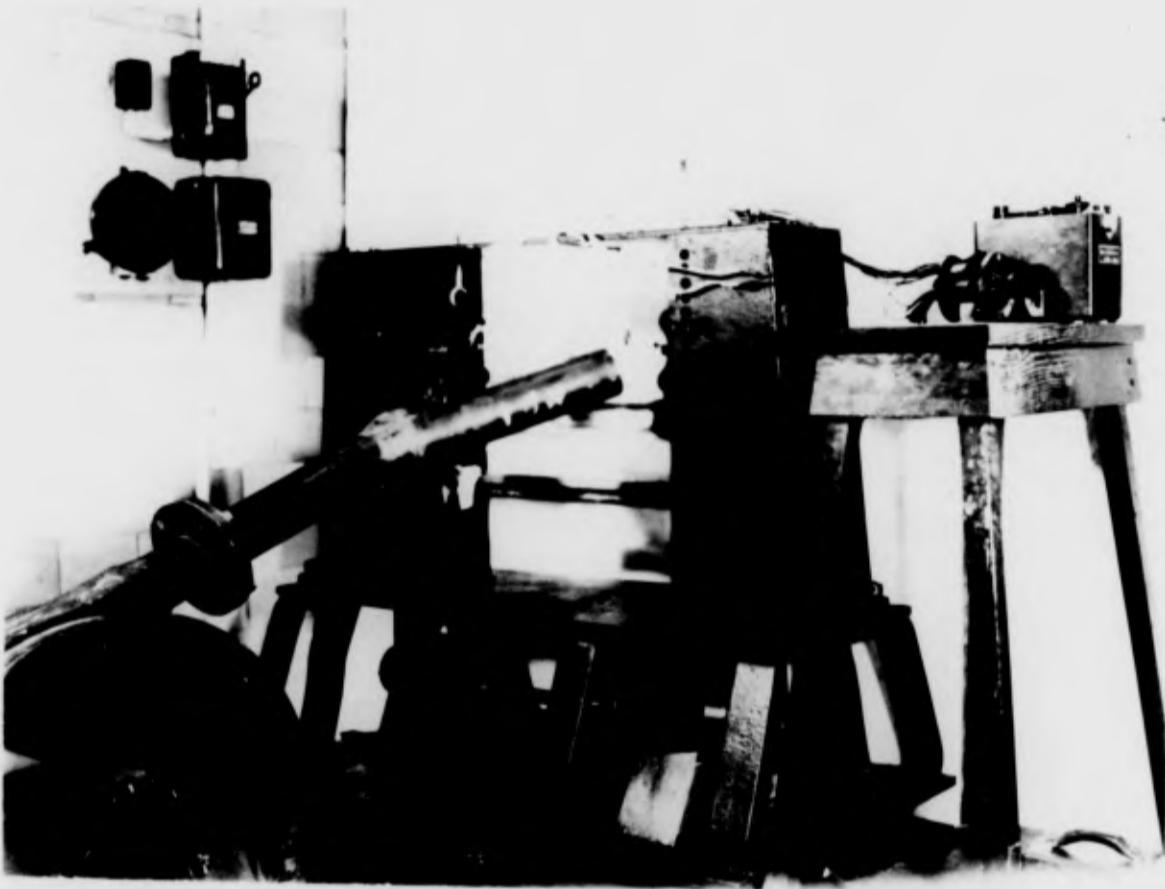


Figure KVIK. General View of Set-up for Air-Cooling Spokes
While Under Repeated Loading Tests.